CLAIMS

What is claimed is:

1. A catheter comprising:

an elongate body comprising a proximal end defining an inlet, and a distal end defining an outlet, the elongate body defining a passageway extending between the proximal and distal ends; and

a modifying element operatively associated with the elongate body such that at least an inner wall of the modifying element is in fluid communication with the elongate body passageway;

wherein flowable formulation introduced into the elongate body inlet moves through the elongate body passageway, contacts the modifying element inner wall, and exits the catheter.

2. The catheter of claim 1, wherein the modifying element is selectively water permeable.

3. The catheter of claim 2, wherein the modifying element comprises a modifying agent within a wall of the modifying element.

4. The catheter of claim 1, wherein the modifying element comprises a modifying agent.

5. The catheter of claim 4, wherein the modifying agent is imbedded within a wall of the modifying element.

6. The catheter of claim 4, wherein the modifying agent is coated on the inner wall of the modifying element.

7. The catheter of claim 4, wherein the modifying agent is immobilized on an inner wall of the modifying element.

8. The catheter of claim 1, wherein the modifying element is a conduit, which conduit is in fluid communication with the elongate body passageway.

9. The catheter of claim 1, wherein the modifying element is a patch present in a sidewall of the elongate body.

10. The catheter of claim 9, wherein the modifying element is selectively water permeable.

11. The catheter of claim 1, wherein the modifying element is a ring-like element defining a modifying element lumen, wherein the modifying element is operatively attached to the elongate body distal end so that the modifying element lumen is in fluid communication with the elongate body passageway.

12. The catheter of claim 11, wherein the modifying element comprises a modifying agent.

13. The catheter of claim 12, wherein the modifying agent is immobilized on the inner wall of the modifying element.

14. The catheter of claim 1, wherein the modifying element is a bulb-like element defining a modifying element lumen, wherein the modifying element is operatively attached to the elongate body distal end so that the modifying element lumen is in fluid communication with the elongate body passageway.

15. The catheter of claim 14, wherein the modifying agent is immobilized on the inner wall of the modifying element.

16. The catheter of claim 1, wherein the elongate body passageway is adapted for delivery of agent at a low volume rate.

17. A drug delivery system comprising:

a catheter according to claim 1; and

a drug delivery device comprising a reservoir;

wherein the drug delivery device is attached to the catheter to provide a flow pathway from the drug delivery device reservoir, into the elongate body passageway, and through the modifying element.

18. The drug delivery system of claim 17, wherein the drug delivery device is a convective drug delivery device.

19. The drug delivery system of claim 18, wherein the convective device is an osmotic pump.

20. The drug delivery system of claim 17, wherein said drug delivery device is implantable.

21. A method for delivery of an agent to a delivery site in a subject, the method comprising the steps of:

implanting at least a distal portion of a catheter according to claim 1 at a delivery site in a subject; and

introducing a formulation comprising an agent into the inlet of the elongate body;;

wherein the introduced agent flows through the elongate body passageway, contacts an inner wall of the modifying element, and is released at the delivery site in the subject.

22. The method of clam 18, wherein the formulation is introduced into the inlet at a low volume rate.

23. The method of claim 18, wherein the elongate body passageway is at least partially filled with an agent formulation prior to said implanting.

24. A method for modifying an agent formulation prior to delivery to a subject, the method comprising:

implanting at least a distal portion of a catheter according to claim 1 at a delivery site in a subject; and

introducing a formulation comprising an agent into the inlet of the elongate body; and

wherein the introduced formulation flows through the elongate body passageway and past an inner wall of the modifying element, and wherein the formulation or the agent in the formulation is modified prior to release at the delivery site in the subject.

25. The method of claim 24, wherein the formulation is modified by dilution during transit through the catheter.

26. The method of claim 24, wherein the pH of formulation is modified increased or decreased prior to exit at the delivery site.

27. The method of claim 24, wherein the agent is a prodrug, and the prodrug is converted to an active drug prior to exit at the delivery site.